CONCORDIA UNIVERSITY

Graduate Studies News

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From the Dean's Desk

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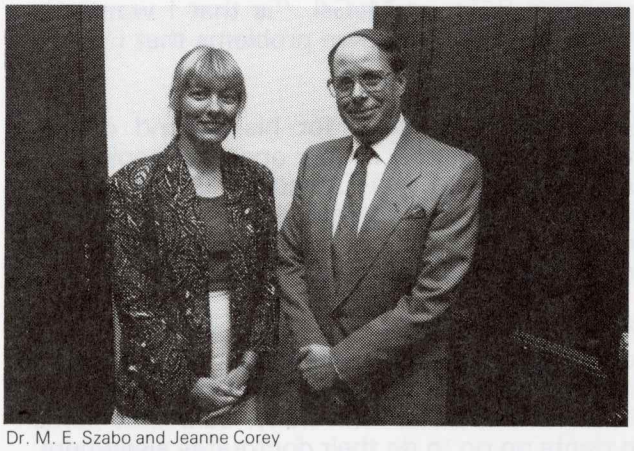
From the Dean's Desk

An Expert System for Graduate Awards

One of the buzzwords of the current computer culture is **artificial intelligence.** While there is no precise generally accepted definition of this relatively new area of investigation, many jobs and enormous sums of money depend on the wide acceptance of the idea that the next generation of computers and computer programs will allow the user to solve problems by carrying out **intelligent** dialogues with mechanical computing devices.

Among the topics of special interest to workers in artificial intelligence is the creation of so-called **expert systems.** They constitute the formal analogue of human experts who give specific advice based on extensive experience. These systems are combinations of two components: coded knowledge solicited from "real" experts, and logical systems that can draw conclusions from this knowledge.

We have called the expert system created by the Graduate Studies Office this summer **The Graduate Awards Companion.** The system facilitates considerably the task of selecting suitable fellowships and scholarships from the 156 entries in the **1987 Graduate Awards booklet.** By giving yes/no answers to about twenty questions posed by a personal computer, students can obtain within seconds a precise listing of the fellowships and scholarships in the guide for which they are eligible. We hope that this new service of the Graduate Awards Office will help to increase the opportunities for success of all Concordia students in postgraduate scholarship and fellowship competitions.



Dr. M. E. Szabo and Jeanne Corey

The real expert behind the Graduate Awards Companion is Jeanne Corey, the Graduate Awards Officer of this university. This office has been growing and expanding its activities systematically over the last few years largely because of the energy and imaginative and gentle leadership which Jeanne has brought to this post. On September 11, Jeanne is leaving Concordia to spend two years on a personal project in Paris. We will sadly miss her and I would like to take this opportunity to express to her, on behalf of the entire Concordia community whom she has served so well, our thanks for her dedicated and successful contributions to graduate studies and to wish her the best of luck in all of her future endeavours.

Among the publications being prepared by the Graduate Studies Office is **The Graduate Studies Guide.** This bilingual booklet is scheduled for distribution for late October or early November of this year and will provide a description of Concordia's graduate program repertoire from a research and career perspective. We will use this publication as a basis for the creation of a more comprehensive expert system that will give advice not only on scholarships and fellowships, but also on career and research opportunities at Concordia.

M. E. Rabb

The M.Sc. (Biology): The Thrill of Research

The only problem with Concordia's graduate program in Biology is that students often find jobs before they finish their theses, says Graduate Program Director, Dr. Muriel Herrington. This tends to delay finishing a thesis – but considering the job market in some fields, Concordia students aiming for a Master's degree in Biology aren't complaining. A lot of students go on to become research technicians, working on various biological or bio-chemical problems at hospitals and universities, says Dr. Herrington.

Robert Roy, 33, is doing research on reproduction in rainbow trout. Learning how to do research is the most exciting part of proving a thesis, he says. "One reason I came back to school" says Roy, who took a break to work in a lab after earning a B.Sc. at McGill, "is that I wanted a choice in picking my own problems that I would deal with myself."

Roy picked Concordia for his second degree because "Concordia is very open to people with work experience, yet Concordia is a place for pure research. I'm interested also in toxicology, and Concordia is the only place in Québec that does research in that field."

Students from as far away as Hong Kong have sought admission to Condordia's master's program in biology. Herrington, who completed her Ph.D. at McMaster University, said that some students go on to do their doctorates elsewhere, but she noted that her department is presently compiling information about and writing dossiers for, the development of a Ph.D. program in biology at Concordia. This program could be approved within two to three years.

Herrington, who has been director of graduate studies in biology for three years, has focused on microbiology and biotechnology research since she came to teach at Concordia nine years ago. Recombinant DNA is a trendy areas of research in her field, one that often takes years of work before results can confirm a hypothesis. Molecular biology has produced such scientific miracles as insulin, human growth hormones, and vaccines.

"But sometimes it's not until 10 or 15 years down the line that we find out how practical research is," she says. Patience is essential in such research, although she quipped that no way to synthesize patience has yet been found.

Dr. M. Herrington, GPD, Biology

The kinds of research offered at Concordia are diverse. Concordia's graduate program is equipped for research in six principal fields: animal physiology, aquatic toxicology, cell biology, ecology, microbiology, plant physiology, and biochemistry.

Concordia faculty members supervise students researching enzymology in intact tissues and cell suspension cultures, morphological, behavioral and physiological aspects of freshwater animals, applied and industrial microbiology, bioenergetics, aquatic toxicology, population ecology, plant physiology and biochemistry. There is also research in wildlife parasitology, microbial metabolism and its control, modifications of genetic and physiological effects of ionizing radiation, reproduction in fish exposed to toxicants, applied microbiology, gene regulation in yeast, and ecology of microbial populations in soil.

Research and teaching facilities are located in the Henry F. Hall Building on the Sir George Williams campus in downtown Montréal. Laboratories and classrooms take up most of the 12th floor, with aquatic and X-ray facilities in the sub-basement and a greenhouse on the 13th floor. A number of specialized facilities, such as darkrooms, laboratories with centrifuges, spectrophotometers and biochemical instrumentation are provided in addition to a water pollution lab, analytical facilities for research in ecotoxicology, a sterile transfer lab, coldrooms and environmentally controlled rooms, an isotope laboratory, and a mobile laboratory and holding facilities for waterfowl. The department shares a Science Industrial Research Unit with Concordia's Chemistry Department.

Another major asset of the department is a program which brings well-known specialists and scholars to teach intensive two-week sessions for graduate students. Dr. Martha Howe, now at the University of Tennessee, recently gave an intensive course in microbiology, which drew students from all over Québec and Ottawa. Dr. Terry Cooper from the University of Pennsylvania, together with Concordia's Dr. R.K. Storms, have just set up a centre for biotechnology and gave a course in recombinant DNA techniques.

Applicants to the M.Sc. program are asked to indicate the research area which interests them most. After applying, students are encouraged to consult prospective supervisors to discuss research projects and financial support. Costs of research are covered by research grants or contracts held by faculty members. Limited funds, in the form of contingency support, is available from the department and the university, and most faculty members have access to funds to support active research programs in their laboratories.

Students can apply for Concordia Fellowships, scholarships, and bursaries to support their studies, and some may qualify for a research grant salary or for teaching assistantships and demonstrating in undergraduate laboratories.

The admission requirement is an honors degree or its equivalent in Biology from a recognized university. Candidates are required to complete a minimum of 45 credits. Those interested in graduate studies in Biology can call **848-3402**, or write to the department at: 1455 de Maisonneuve Blvd. W., H-1253, H3G 1M8.

Civil Engineering: The Art of Making Things Work

If finding solutions for intricate problems is your idea of fun, Concordia Univeristy has the graduate program for you: students in Civil Engineering striving for a Master of Engineering or a Ph.D. in Civil Engineering never lack for interesting puzzles to solve – or career opportunities.

Dr. Matt Douglass, Chair of the Department of Civil Engineering, says that curiosity is what draws most students to engineering – and that research and practical application are what keep them there.

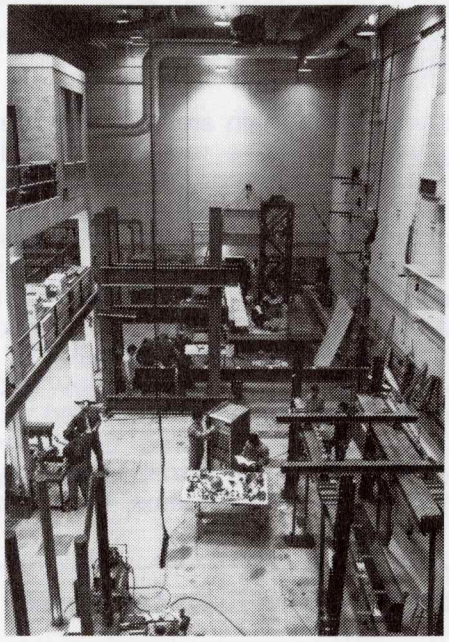
"The students who come to us are interested in why things stand up and don't fall down," said Douglass, "or why a thin shell can hold a heavy snow load – remember the trick of squeezing an egg and not being able to break the shell? You have to enjoy solving problems to like engineering."

Douglass, who earned his Ph.D. at Oklahoma State University, made his career decision at the tender age of 11. "When I was growing up I liked to find out how and why things worked," he explained.

Poorooshasb also made his career decision young: "I decided when I was in grade 5. I liked to build things, it was very simple."

Douglass came to Concordia in 1966 after nine years of teaching in Washington D.C. and five years in industry. He has taught the "whole gamut" but his speciality is structural analysis – which determines the forces that act on the different elements of a structure so that it can be designed to carry loads without failure under working conditions.

"Insects, animals and human beings have been builders from the beginning of time," Douglass



Civil Engineering Lab with Graduate Set-up

pointed out. "We learn a lot from animals. We can learn about cable structures from spider webs, and we can study the shape of caverns and caves to learn how to design structures with such fabricated materials as concrete. But we can also think and create; building becomes an art and a science."

Faculty members are very excited about a recent agreement the department signed with Kyoto University in Japan. The agreement involves an exchange of research, and allows Concordia to send students to Kyoto with travel and living expenses paid. "Japan is one of the top countries in geo-technical engineering; we can learn from co-operating with them," said Douglass. "They are taking one of our students this year. He has a scholarship to go to Japan to work on problems associated with the soft ground located at the bottom of the sea. We will appoint one of their professors as a co-supervisor with a Concordia professor."

Students in the M.Eng. program can choose a course-oriented option that provides them with the opportunity to develop design skills and enhance their ability to write technical material. A total of 45 credits is required, with either 39 or 42 being from required courses, depending on the orientation.

M.Eng. candidates can also opt to write a thesis which immerses them in research in a chosen area. Of 45 credits required, 24 are earned through coursework and 21 are for the thesis itself.

The Doctor of Philosophy in Civil Engineering requires a dissertation that demonstrates both a strong grasp of the field and a mastery of a specific area of concentration, with an original contribution to the field of knowledge. Students already holding an M. Eng. must earn 90 credits. The exceptional and outstanding student with a B. Eng., may be permitted to enter the 108-credit doctoral program

Research covers three main areas: 1. Structural Engineering which includes research in bridge design and concrete structures, along with structural dynamics and earthquake engineering. 2. Geotechnical engineering focuses on applied research in such areas as resistance of shell foundations to earthquakes, the behavior of batter piles subjected to repeated and pullout loads, and the behavior of machine foundations. A Foundations Engineering Laboratory is now under construction at Concordia and is expected to be finished in a year. 3. Systems Engineering research includes design of transportation systems and water resource systems, using both experimental lab work and computer modelling and simulation.

"This particular system is as powerful as a mainframe," said Dr. Oscar Pekau, whose own speciality is earthquake engineering. "It has sophisticated graphics and a dedicated system with a sophisticated de-bugging system."

Not all engineering is nuts, bolts and concrete: Dr. Adel Hannah is currently involved in a project which combines engineering and biomedical research related to foot injuries such as those caused by jogging. "It's an engineering and medical project testing human beings," said Hannah, who has been at Concordia for 10 years. "We're studying how feet react to different kinds of loading to design a shoe to prevent injury."

Graduates with the M.Eng. or Ph.D. have landed jobs with corporations, governments and universities all over the world as consulting, design, process, project and stress engineers, and as research scientists and professors.

"Formerly when someone graduated with a B.A. they went to an office and did calculation work, that's all done by computer now," said Douglass. "Now there's a greater need for planners and civil engineering systems as a whole. Civil engineers are very good as planners because of the attention they have to pay to detail in order to make certain everything works – they often become managers once they get into industry."

Those interested in graduate studies in Civil Engineering can call **848-7801** or write to: 1455 de Maisonneuve Blvd. W., ER-303, H3G 1M8.

Graduate Profile: Dr. Radu Zmeureanu

Dr. Zmeureanu is a recent graduate from the Faculty of Engineering and Computer Science, with a Ph.D. in Building Engineering. Having defended his thesis in January of this year, he graduated with the 1987 June convocation.

His thesis title "Computer Simulation of the Effect of Building Thermal Mass on Thermal Loads" indicates the nature of the work on which he is presently working. As Assistant Professor in Concordia's Centre For Building Studies in the Faculty of Engineering and Computer Science, his areas of research interests are: energy analysis in buildings, computer applications on the system of energy-responsive buildings, design tools for HVAC systems, and energy conservation.

Amongst his personal interests the study of literature and history figure prominently. He also enjoys the many discoveries he makes while travelling throughout Canada with his wife and their two children.

Graduate Profile: Dr. Radu Zmeureanu

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